

BUOG AIChE Magazine
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TABLE OF THE CONTENT

• Magazine Contents	1
• Introduction to the Students Chapter	2
• What do you know about Chemical Engineering	3
• Biofuels	4
• Generation of Electrical Energy from the Heat of the Earth's Core	8
• Interview	11
• Why We Flare	13
• Safety Message	16
• AI Uses in Chemical-Engineering	19
• Excerpts from the AIChE Chapter Reports	22
• Myth and Fact	24
• Across, Down	25
• Maze	26
• Chapter Achievements	27
• Magazine Team	29



BUOG AIChE (American Institute of Chemical Engineers, BUOG University Student Chapter) is a branch of the world's leading organization for chemical engineering professionals. It is a nonprofit organization with more than 60,000 members from over 110 countries. AIChE has the breadth of resources and expertise you need, whether you are in core process industries or emerging areas. BUOG AIChE Student Chapter was founded in 2022.

Our main goal is to bridge the gap between the theoretical approach we study in college and the practical approach witnessed by engineers in the field. We can achieve our goal through Technical Sessions, Events, Courses, and Visits to Companies. Therefore, we provide extensive training in chemical engineering, along with contemporary topics, so that graduates are prepared to take up various positions in a wide range of industries, academia, and research organizations.

MISSION:

Our mission is to connect our members with resources, expertise, and a global network of colleagues. We strive to provide access to information on recognized and promising chemical engineering processes and methods. Ultimately, we aim to support our members in advancing professionally within the AIChE community and contributing to the betterment of society.

VISION

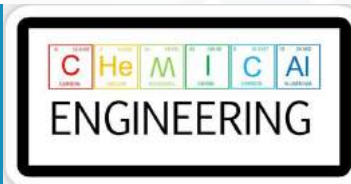
Our vision is to foster a community of chemical engineers and students dedicated to advancing the field and enriching the world we live in through education, collaboration, and the sharing of knowledge.

Why BUOG AIChE

We provide extensive training in chemical engineering along with contemporary topics so that the graduates are prepared to take up various positions in a wide range of industries, academia, and research organizations.

As a member, you can access information on recognized and promising chemical engineering processes and methods. Connect with a global network of intelligent, resourceful colleagues and their shared wisdom. Find learning opportunities from recognized authorities. Move forward professionally with AIChE and enrich the world we live in.

WHAT DO YOU KNOW ABOUT CHEMICAL ENGINEERING



Chemical engineering is a discipline that combines principles of chemistry, physics, mathematics, and engineering to improve processes that transform raw materials into useful products. It involves the application of scientific knowledge and engineering techniques to solve problems related to the production, processing, and use of fuels, pharmaceuticals, and other materials.

The industrial sectors supervised by chemical engineers are very diverse, with the most important ones being the chemical, petroleum, and petrochemical industries, as well as the use of nanotechnology and nanomaterials. Additionally, the food and pharmaceutical industries, as well as biochemical and biomedical engineering, heavily rely on chemical engineers. This also includes pollution control and reduction, environmental corrosion science, automation and machine science, space science, nuclear materials, and more. Chemical engineering plays a crucial role in the oil and gas industry through the application of its principles and techniques in several aspects, examples of which are: After the extraction of oil and gas from wells, chemical engineering takes charge of designing and operating oil and gas production units to convert raw materials into usable oil and gas products. It also plays a role in the field of oil refining, where it works on designing and operating oil refining units to convert crude oil into various oil products. These products include gasoline, diesel, derived oils, greases, and asphalt. Techniques such as distillation, hydrocarbon refining, and chemical refining are used to improve the quality and properties of these products. Gas conversion techniques are also used to produce various gas products, including petrochemicals such as ethylene, polyethylene, ammonia, methanol, liquefied natural gas (LNG), and compressed natural gas (CNG).

These techniques involve processes such as gas refining and chemical conversion to enhance the quality and properties of these products. Additionally, chemical engineering works on developing and improving environmentally friendly processes and techniques for controlling harmful emissions and ensuring the safety of workers and facilities in the oil and gas industry.



These are some examples of the role of chemical engineering in the field of oil and gas. It can be said that it contributes to improving the extraction, refining, and conversion processes of oil and gas, achieving higher efficiency, safety, and environmental protection. And let's not forget the important role that chemical engineering plays in the field of medicine through the application of its principles and techniques in several aspects. Among the examples of this is the manufacturing of pharmaceuticals, where chemical engineering contributes to the design, development, and improvement of pharmaceutical manufacturing processes. It works on converting raw materials into final medications using efficient and safe methods, ensuring the quality and stability of pharmaceutical products. It also plays a crucial role in the design and operation of pharmaceutical production units, such as drug manufacturing plants and packaging facilities. These units aim to ensure the safety and quality of medications and achieve efficiency in pharmaceutical processes. Chemical engineering utilizes automation and process control techniques to enhance the efficiency and accuracy of pharmaceutical manufacturing processes and reduce human errors. Chemical engineers also play an important role in the design and development of medical devices, including imaging devices (such as MRI and X-ray machines) and bioanalytical devices.

BIOFUEL



Introduction

Human uses energy daily to provide their needs for heat, light, and electrical power, which is often sourced from burning fuel. Although there are many different types of fuel, the main ones are coal, oil, gas, and uranium, and all these types of fuel come from the earth's crust. They are called fossil fuels because they are produced from the remains of animals that died millions of years ago. There are problems with these types of fossil fuels because they are available on the earth in limited quantities, and once we consume all their sources, the energy they contain will be lost forever, in addition to that we burn these types to obtain energy, which leads to air pollution due to gas exhausts. The whole world is looking for new ways to save energy by finding inexhaustible sources of energy that do not pollute the air at the same time, and so far scientists have found only four sources of energy, which the thermal energy found in the rocks in the ground, the energy from salt water, and sunlight, And from the force of gravity, where these sources can be available without pollution, and despite the possibility of using waste to provide energy, it causes pollution as a result of combustion, and with the increase in demand for traditional energy sources such as coal and gas, the world has had to search for alternative sources, especially renewable sources such as solar energy and energy geothermal, hydro, hydrogen, wave, biomass and nuclear energy. These sources are renewable energy sources because they are inexhaustible no matter how they are used.



The concept of biofuels

The biofuel is a fuel containing mono-alkyl esters of long-chain fatty acids derived from fats. It is produced by transesterification.

It is one of the oldest types of fuel due to the human use of burning firewood, wood, and plants in heating and cooking since time immemorial that extends for thousands of years, as the main source of fuel production was the biomass of plants and animals. After the industrial revolution and the discovery of fossil energy sources represented in crude oil, coal, and natural gas, followed by the discovery of nuclear energy for peaceful purposes.

Biofuel is produced in different ways and many types, depending on the materials, intermediate crops, or the processes required for its production from decomposition or chemical fermentation. In general, biofuel can be of three types, either solid and is represented by all plant residues, including various woods, or gaseous, which is methane gas extracted from the decomposition of plants, waste, animal dung, or waste by backfilling and decomposing it in an oxygen-free environment. Finally, it is a liquid, as it is produced in two basic types. The first is ethanol, which is a transparent alcoholic liquid that has no color and has a somewhat sweet taste. Its concentrate has a burning taste and a pungent odor. It is used as an energy source instead of gasoline, or mixed with gasoline in different proportions for many reasons, the most important of which is reducing pollution resulting from the burning of gasoline in car engines. It is mostly produced from plants and their by-products, especially plants that contain a large amount of sugar and starches, such as sugar cane, sugar beet, corn, and wheat, through the fermentation process. The second is biodiesel oil, which is produced either by mixing vegetable oil or animal fats with alcohol or from direct vegetable oil produced from oil crops or cooking oils after using them in restaurants or kitchens.

BIOFUEL



Liquid biofuel is the only renewable energy source alternative to fossil fuel for use in all fields, as it can be transported, stored, and used in multiple ways, and it is a clean, renewable, and cheap source. Biofuel also can create many job opportunities, and based on the above, it can be said Biofuels can be produced at any time and in any part of the earth, due to the availability of raw materials and not being restricted by any geographical or natural factors, which is a major advantage that other renewable energy sources lack, such as solar energy, which is related to the amount of sunshine, and wind energy that cannot be provided. Throughout the months of the year, hydropower, which is linked to the presence of waterways and sea coasts, is not available to all countries.

Biofuels can be divided into three generations

The first generation: depends on the production of biofuels on the seeds and grains of plants such as corn, wheat, soybeans, sugar cane, barley, and sunflowers in addition to dates. on agricultural activity as well as the world's poor due to a significant rise in international grain prices,

The second generation: depends on plant residues and residues such as wheat stalks, maize, sawdust, etc., where biofuel is obtained from cellulose, methanol, and bioethanol. into an organic fertilizer that fertilizes it.

The third generation: This generation is characterized by the use of algae to produce biofuel. Many recent studies indicated that green algae is a fuel source that falls under renewable energy sources, especially after the continuous increase in the price of fossil fuels. It has a limited impact on the environment and does not affect the global need for food. Therefore, it is possible to reach the truth that the best crops that can be used as biofuel are algae, as they are not suitable for human use, in addition to the fact that they grow in the sea or on farms where ordinary water or seawater is used. They grow within 12 hours, as they are characterized by a rapid growth rate.



BIOFUEL



Biofuels and the environment

Biofuel is considered one of the environmentally friendly fuels because the gases emitted from its combustion in car engines are less than the amount of gases emitted from the combustion of gasoline or petroleum diesel in the engines themselves. For example, the combustion of diesel made from the oil of the *Jatropha* plant generates one-fifth of the amount of carbon dioxide than the combustion of fossil fuels, and this means that 80 percent of the damage caused by petroleum diesel is reduced to the environment. In addition to the possibility of obtaining biofuel from the industrial analysis of crops, excrement and animal residues that can be reused such as straw, wood and manure, waste decomposition, and food waste, which can be converted into biogas. But if the environmental impact is calculated from start to finish for biofuel production, the bad effects of biofuels are greater than the bad effects of oil derivatives. Recently published scientific studies hypothesize that most, if not all biofuels can lead to increased risks of greenhouse gas emissions in the short to medium term and cause other environmental and social impacts. The belief that biofuel is environmentally friendly stems from the fact that the gases emitted from its combustion in car engines are less than the amount of gases emitted from the combustion of gasoline or petroleum diesel in the engines themselves. The truth is that it is a belief that is not consistent with reality and lacks many facts because it does not include the environmental impact of growing crops. Biofuel production, which includes fertilizers and pesticides, and does not include the environmental effects resulting from huge freight cars that transport corn and ethanol, especially since ethanol cannot be transported by pipes for technical reasons related to the mixing of water with it, in addition to deforestation operations, as in Brazil, tropical forest trees are cut down to plant Sugarcane is used to produce ethanol. It is known that the ability of forests to absorb carbon dioxide, one of the most important greenhouse gases, is much greater than the ability of crops to absorb it.

In addition, the conversion of agricultural fields producing food crops into large mines to produce the promised energy crops, and the consequent disruption of global agricultural diversity. The encroachment on forests and protected green areas, the increase in soil erosion rates, and the high levels of water and air pollution due to the large quantities of pesticides and fertilizers required for the cultivation of energy crops. In addition, the combustion of biodiesel produces nitrogen oxide gas in larger quantities than petroleum diesel.

Will developing countries become rich because of biofuels, or will poverty rates rise?

Biofuels may greatly help developing countries because they lead to an increase in labor employment rates as well as greater use of agricultural land, but there are concerns about the adverse impact of the increase in demand for biofuels. This increase in demand for biofuels leads to an increase in the demand for raw materials. used in its manufacture, and thus the consumption of larger areas of agricultural land, and this leads to the confinement of agricultural lands used to meet consumer demand for foodstuffs.



BIOFUEL



Water use and pollution

Water for agriculture is a major concern in terms of its availability and quality, as agriculture already consumes 70 percent of the available fresh water on a global scale. Increasing irrigated land without sustainable management of ground and surface water will lead to water scarcity. Another impact on the water comes from agrochemicals that pollute surface and groundwater. Running water that contains large quantities of fertilizers leads to the enrichment of lakes and coastal areas with nutrients.



The future of biofuels

There are technologies for the production of biofuels that may play an important role in the future in providing biofuels at a lower cost and in a way that is less harmful to the environment. Among the technologies that have received great attention are:

- **Algae-based biofuels:** or third-generation biofuels. Algae-based biofuels are a promising technology for the future because of their high productivity and carbon neutrality. They can be grown on non-arable land and can also absorb carbon dioxide during growth.
- **Using genetically modified bacteria to produce biofuels:** Scientists have succeeded in modifying bacteria to consume plant waste and produce biofuels as a by-product. Not only does this technology provide a renewable source of energy, but it also offers a solution for agricultural waste management.
- **Bioenergy with Carbon Capture and Storage (BECCS):** A technology that combines bioenergy production with carbon capture and storage. It is considered a negative emissions technology because it removes carbon dioxide from the atmosphere. Biomass absorbs carbon dioxide during growth, and the carbon dioxide produced during biofuel generation is captured by various carbon capture and storage technologies.



GENERATING ELECTRICITY

FROM THE HEAT OF THE EARTH'S INTERIOR

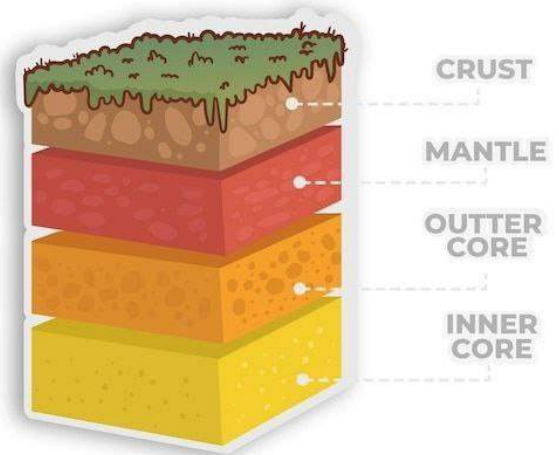
Did you know that the temperature deep within the Earth is extremely high, and such heat can be used to generate energy? This energy, known as geothermal energy, can be defined as follows: it is a renewable energy source because heat is continuously produced inside the Earth's deepest layers. We know that the Earth is composed of layers, and we live on the crust, which is the outermost layer of the Earth. But what about the Earth's interior, its core? The deepest region of the Earth, as we mentioned, possesses extremely high temperatures that can be compared to the heat of the sun. We can say that the molten core of the Earth, about 4,000 miles below us, is hot, reaching temperatures of over 6,000 degrees Celsius.



This is why the geothermal energy industry is often referred to as "the sun beneath our feet." The continuous difference in temperature between the Earth's core and its surface leads to the transfer of heat energy from the center to the outer surface. It is worth noting that the term geothermal energy comes from two Greek words: "geo," meaning earth, and "there" meaning heat.

Someone can wonder where the latent heat in the Earth's interior comes from. One of the reasons that contributes to the high temperature of the Earth's layers is the molten core, which contains a significant amount of heat energy that flows towards it. Additionally, gravitational forces and the friction between the Earth's layers result in an increase in the temperature of rocks and water within them. The decay of radioactive materials present in the Earth's interior also leads to an increase in the temperature of the Earth's atmosphere, such as the decay of radium, uranium, thorium, potassium, and other elements with radioactive activity.

LAYERS OF THE EARTH



The presence of this heat varies from one location to another, as the availability of geothermal energy differs based on the geological characteristics of the area. Typically, regions with high geothermal potential have several factors in common. For example, areas near tectonic plate boundaries or volcanic regions tend to have higher geothermal heat. The presence of hot rocks or reservoirs is also a contributing factor. Regions with high geothermal potential often contain hot rocks or reservoirs of hot water located near the surface. This makes the extraction of geothermal energy easier and more cost-effective. The geological composition also plays a significant role, as areas with porous and permeable rock formations may contain underground heat reservoirs that can be utilized for energy extraction. In summary, regions with high geothermal potential typically have a combination of geological factors that make the extraction of geothermal energy easier and more cost-effective.

GENERATING ELECTRICITY

FROM THE HEAT OF THE EARTH'S INTERIOR

Energy Sources

Geothermal energy sources can be divided into two categories: groundwater and hot rocks, both of which are valuable sources of geothermal heat. The heat contained in these sources can be converted into usable energy through geothermal power plants or direct-use applications, providing a sustainable and reliable source of renewable energy.

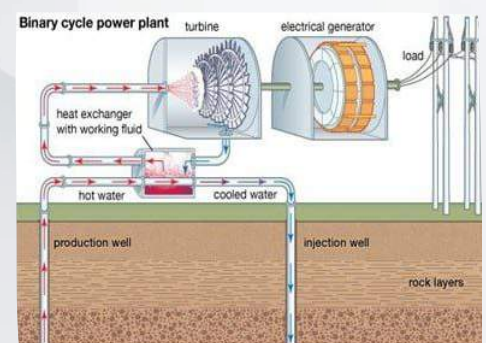
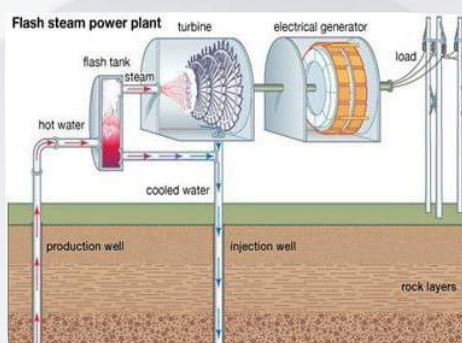
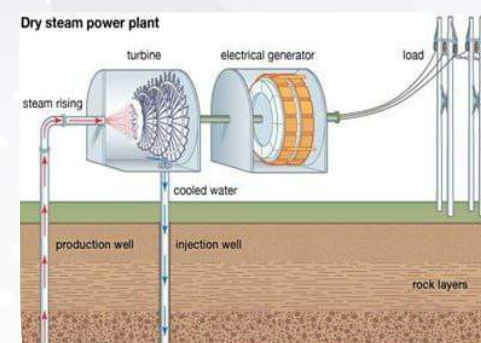
Geothermal heat can be utilized in various industrial processes, such as food drying, wood drying, milk pasteurization, and industrial drying applications. It can also be used for water desalination, where heat is used to evaporate and condense seawater, resulting in freshwater. Geothermal hot springs and hot water wells are often used for swimming purposes, providing warm water and steam for relaxation and health benefits.

These are just a few examples of the methods used to harness geothermal heat. The specific method chosen depends on the available resources and geographic location.

How does geothermal energy work?

There are several ways to use geothermal heat, depending on the specific application and available resources. Here are some common methods: First, direct use, where geothermal heat can be used directly for various purposes without being converted into electricity. This includes building heating, as well as the provision of hot water for residential, commercial, and industrial uses as it is considered a cost-effective method. Secondly, geothermal power plants where geothermal heat can be used to generate electricity in geothermal power plants. There are three main types of geothermal power plants: First, dry steam power plants: are the most widespread types, and they work by pumping hot steam directly from the hot water stock located in the ground to a turbine, which rotates the electric generator connected to it, and thus generates electrical energy. After the hot steam passes through and circulates to the turbine, the steam is condensed and thus converted into water, which is returned to the ground through the injection well. Secondly, through flash steam power plants: these stations differ from dry steam plants in that hot water is pumped instead

of steam at high pressure directly to the evaporation tank located on the surface of the earth, and the temperature of the evaporation tank is low, as well as its pressure, and this decrease in The heat and the difference in pressure causes the hot water to evaporate, and steam is formed that is directed towards the turbine to rotate and the electric generator rotates with it. After that, the steam is cooled and condensed to become water that is returned to the ground through the injection well. Finally, through the dual-cycle power stations, the dual-circuit power stations differ from the previous stations in that the steam from the subsoil water does not reach directly to the turbine, but the hot water is pumped from the subsoil to a heat exchanger, where the hot water passes through tubes within a different liquid with Low boiling point (less than the boiling temperature of water) and the second liquid turns into steam due to the heat of the water in the pipes and goes towards the turbine, so it rotates and the electric generator rotates with it, and then the water returns to the ground through the injection well, while the steam that rotates the turbine It is condensed and returned to the heat exchanger for reuse.



GENERATING ELECTRICITY

FROM THE HEAT OF THE EARTH'S INTERIOR

Pros and Cons of geothermal energy

Like any form of energy production, geothermal energy has potential advantages and disadvantages. Here are some of the major benefits and drawbacks of geothermal energy:

One of its advantages is that it is a renewable source of energy, which means that it is constantly replenished and can be used indefinitely without depleting resources. Geothermal energy is a low-carbon energy source, which means it produces few greenhouse gas emissions during operation. Most systems emit only water vapor, although some emit very small amounts of sulfur dioxide, nitrous oxides, and particulate matter, making them a valuable tool in combating climate change. Unlike solar energy and wind energy, geothermal energy is available 24/7, making it a reliable and stable source of energy. Geothermal resources are often located close to the communities that can use them, reducing the need for long-distance transmission lines. Once a geothermal power plant is in place, its operating costs are relatively low, making it a low-cost energy source.

As for its disadvantages: Geothermal energy resources are not evenly distributed, so not all regions are suitable for geothermal energy production. Geothermal energy production can have environmental impacts, such as the release of greenhouse gases and the possibility of land subsidence or earthquakes in certain areas. Also, the upfront costs of building geothermal power plants can be high, which could be a barrier to entry for some developers. Geothermal power plants also require large amounts of water to operate, which can be a concern in areas with limited water resources. Overall, geothermal energy has many potential benefits as a reliable and sustainable source of energy. While there are some environmental and economic drawbacks, they can often be remedied with careful planning and management.

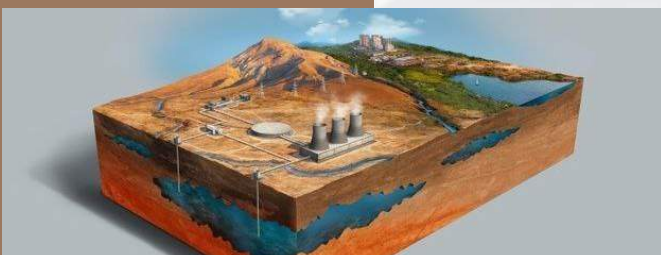
What are the host countries for underground energy?

On the part of foreign countries, geothermal energy is considered a valuable resource that exists in many countries, including the United States, Iceland, the Philippines, Indonesia, and New Zealand. In addition to other countries that enjoy large resources of thermal energy. As for the Arab countries, many countries enjoy the potential of geothermal energy, but this energy is currently not developed on a large scale in the Arab world, including Saudi Arabia, Jordan, Oman, Egypt, and Tunisia. In general, although there is potential for geothermal energy in the Arab world, its development is currently limited. However, with the increasing global interest in renewable energy sources, more attention may be given to geothermal energy in the region in the future.

Iraq's ability to invest in ground energy

Iraq has great potential for investing in geothermal energy due to its location in the tectonically active region known as the Zagros Mountains, in addition to several well-known geothermal areas, especially in the western and southwestern parts of the country, where estimated temperatures range from 70°C to 200°C. The country also has significant experience in the oil and gas industry and has expertise in drilling and developing wells that can be diverted to geothermal projects. However, several challenges need to be addressed before geothermal energy can be widely adopted in Iraq. These factors include a lack of public awareness and understanding of geothermal energy, limited access to capital for geothermal projects, and the need for specialized equipment and technology. Despite these challenges, Iraq has a promising future in geothermal energy.

In the end, geothermal energy is renewable energy and is like a gift from the Earth, although we may sometimes need to drill additional wells over time to ensure a certain level of energy production, the Earth continues to provide heat and it is stored in the Earth when our planet was formed since Billions of years.



INTERVIEW

ABOUT SHUAIBA REFINERY



Engineer Abdul Zahra Qasim Khalifa

Senior Chief Chemist

He previously worked in the General Fertilizers Company and currently works in the South Refineries Company

Historical introduction

The South Refineries Company was founded in 1969 through the construction of the AL Basra refinery, and production began in 1974 with the first refining unit its production capacity is 70 thousand barrels/day (barrel = 159 liters), and per hour it produces 464 cubic meters/hour. It is one of the major transformational companies in The country, where petroleum products are produced with the most advanced scientific and technology, which match international standards, and ensure the needs of consumers.

also, the company is undergoing further expansion and updating with a diversity of improved quality products, where distillation unit 2 was established in 1976 production started in 1979, and gasoline reforming unit 2 was established in the late 1970s. (we can say that the first and second units are two sides of the same coin), and in the year 2007, the contract was signed to build a third distillation unit refinery. and it was entered into the auction process on the date of 1/3/2014. The third unit is modern and developed in terms of system and design, and the difference is clear between it and the first and second units. The productivity of the third unit is equal to the productivity of the first and second units, but its system is newer, and work is currently underway on distillation unit 4.

Production staff and departments:

A / Basrah Refinery Dep.1

- 1- crude distillation unit 1 70000 BPD
- 2- light cut hydride sulphuration unit 29000 BPD
- 3- catalytic reforming unit 8000 BPD

B / Basrah Refinery Dep. 2

- 1- crude distillation unit 1 70000 BPD
- 2- light cut hydride sulphuration unit 29000 BPD
- 3- catalytic reforming unit 8000 BPD

C/ Basrah Refinery Dep.3

- 1- crude distillation unit 70000 BPD
- 2- naphtha HDS unit 6000 BPD
- 3 - catalytic reforming unit 10000 BPD

D/ LPG Production Section Includes.

- 1- 1st LPG unit Capacity 200 ton/day
- 2- 2nd LPG unit Capacity 200 ton/day
- 3- 3rd LPG unit Capacity 200 ton/day
- 4- Storage Unit.

It was established in 1977 and accomplished in 1982. production started in 1996 with a variety of lube oils. it is considered a major source of our national economy as it meets the needs for lube oil and derivation, with a production capacity of 10000 tons/ year.

It includes a vacuum distillation unit asphalt unit, furfural_ treating unit, dewaxing unit, and lube oil hydrogenation blending and filling unit.

There are other staff such as the external refineries staff, which include the following sections: Dhi Qar Refinery Section and Musaffar Maysan Section.

Is there are difference between production previously and now?

The production capacity was previously fixed, and now it is 70000 BPD, but production is controlled according to conditions (consumption, maintenance factors, availability of materials, etc.)

Accidents in Units

There are frequent accidents and there are rare accidents, for example, furnace problems occur approximately every 10 years.

For example, the problem of pipes, inside the furnace there are pipes made of metal that is a good conductor of heat and is resistant to deformation processes. Sometimes operational problems occur, for example, blockage of the pipe due to bending, deformation of the metal occurs, and as a result of the resulting blockage, the pipe gains heat and does not lose it, which leads to melting of the pipe turning its color into The red color or red spots appear in it, so the workers are forced to stop the unit, the metal is examined and the problem is diagnosed, after which it is cut and replaced. This problem occurs between separate periods.

The other problem is the fires that occur in equipment, for example, furnaces, which is a rare problem the other problem is the problem of leakage that occurs in the towers or inside the furnace, and it is dealt with in different ways and the problem of corrosion in pipes, for example, gasoline pipes. The unit must be stopped until all the produced gasoline is emptied from the pipe because as long as there is gasoline, the corrosion does not stop, after which the pipe is cut off and replaced.

Frequently occurring problems, problems with pumps and electricity, if the electricity is cut off suddenly, and if even the time for cutting is short, this costs great losses, and the refinery stops in general because when the current is turned off and turned back on again, we will need to reheat the materials again and the product is monitored In the laboratory until its specifications conform to the standard specifications, this process takes 4, 6, or 24 hours, and sometimes

days, until the product is transferred to the production tank with standard specifications, and each product has different standard specifications from others.

What is the most malfunctioning equipment?

Pumps are the equipment most vulnerable to malfunction, and the most prominent problem with pumps is corrosion due to salts, especially where the higher the salt concentration, the greater the corrosion in pumps. To solve pump problems, only the damaged part is replaced, that is, an annual maintenance process is carried out on all equipment.

The problem of corrosion also occurs in the pipes (a frequent problem), so we have to replace them. To reduce corrosion, special chemicals are used that reduce the presence of HCl to the least possible extent to give a longer period to the equipment.

Updates to the unit

The most important update in the control unit was an old system, which is the tuning system. Precision machines depend on two values, a required value and the heat in the product. The tuning system tries to match them, and if they are equal, it stops the fuel supply to stop the heating process.

Previously, the control was done manually by manipulating the Gage, but now the control has become digital only, the device is provided with the required information, and the processing is done automatically, such as temperature, pressure, and others. Recently, a desalter unit has also been developed.

Problems affected due to the age of the unit

- Depreciation, for example, pumps or units with time operate until they reach a stage where they cannot be operated, i.e. they have a specific life after which no maintenance can be done for them due to the severity of their damage, for example, corrosion of metals in pipes or corrosion of pipes inside the furnace or their blockage that leads to preventing heat conduction and others.
- As well as the conductivity of the metal, when it reaches a stage of use, deposits begin to accumulate on it, so the conductivity decreases even if it is cleaned. When the equipment becomes unusable, it must be replaced with a new one.

Advice given to students

Relying on the college curricula in addition to joining non-curricular courses and acquiring as much information as possible. We also know that the college curricula provide us with theoretical information, laws, and approved scientific calculations, but we need practical information related to the work site through self-education and the search for useful practical information at work sites.

WHY?

WHY WE FLARE ?

Flare is the final Safety guard of the plant. Uses relieve over-pressure and the Flaring is a volatile organic compound (VOC) combustion control process in which the VOCs are piped to a remote, usually elevated, location and burned in an open flame in the open air using a specially designed burner tip, auxiliary fuel, and steam or air to promote mixing for nearly complete (> 98%) VOC destruction.

and we find this flare in oil production sites, Refineries, Fertilizers plants, Petrochemical Plant, Gas Plant, Transportation /Storage, and LNG Plants.

A gas flare, instead called a flare stack, could be a gas combustion device utilized in industrial plants like oil refineries, chemical plants, and gas process plants likewise as at oil or gas production sites having oil wells, gas wells, offshore oil and gas rigs and landfills. and from Sources of excessive gases: In UpStream,

When petroleum fossil oil is extracted and created from oil wells, raw gas (associated gas) related to the oil is dropped at the surface. Particularly in areas of the planet lacking pipelines and different gas transportation infrastructures, huge amounts of such associated gas are usually flaring as waste or unusable gas. That is why we, in the upstream industry, are using a flare to get rid of the gas associated with the oil on purpose. As for the downstream, such as in refineries, it is necessary to get rid of the excess gas present in the equipment, and thus it is protected from explosion by directing the excess gases to the flare to burn it.

Gas flaring at several oil and gas production sites protects against the risks of over-pressuring Process equipment. an example of the results of failure to flare escaping gas was evident within the Bhopal disaster once a flare tower was broken and could not flare escaping methyl isocyanides gas (MIC) (The gas had been in an over-pressured tank and discharged by safety relief valve), that resulted in its release into the surrounding environment.

We need a safe and efficient way for disposal through some :
Direct, Venting to atm without combustion.

Reinjection, associated gas is re-injected into the reservoir, which saves it for future use while maintaining higher well pressure and petroleum producibility.

, Flaring and Incineration

Like flaring, incineration is the controlled combustion of waste gases, but the combustion occurs in controlled conditions below or within the stack. Incinerators provide better combustion of waste gases due to being protected from wind and other climatic conditions. and preferred when Waste gas contains high concentrations of acid gases.

Gas Reinjection is preferred when

Too much quantities of associated gas and no field facilities are available. and when the geological nature of oil formation enhances the gas recovery and gas does not migrate through.

Direct Venting is preferred when Waste gas contains a high concentration of " INERTS ". and when Cases dispose of purge gases (Like N_2). and when Waste gas contains insufficient HC's content.



WHY?

WHY WE FLARE ?

FGR

Flare Gas Recovery Systems are one of the cleanest solutions to minimize or eliminate gas flaring.

So There is a range of methods to reduce and recover flaring, summarized as follows:

1. Collection, compression, and injection/reinjection
 - a. into oil fields for enhanced oil recovery.
 - b. into wet gas fields for maximal recovery of liquids;
 - c. collection and delivery to a nearby gas-gathering system;
 - d. using as a feedstock for petrochemical production
 2. Gas-to-liquid (GTL)
 - a. converting to liquefied petroleum gas (LPG).
 - b. converting to liquefied natural gas (LNG).
 - c. converting to chemicals and fuels.
 3. Generating electricity
- to select the best method for flared gas recovery and reduction, operators must have a good understanding of how the flare gases are produced, distributed, and best consumed at the production facility.

So why isn't associated gas, which is being flared, injected for reservoir pressure maintenance instead of injecting water, especially in Iraq?!

From a reservoir perspective, it depends on the nature of the reservoir and the fluid distribution within it. Some reservoirs contain water, oil, and gas (gas cap). However, some reservoirs only contain oil and water. Therefore, sometimes gas injection cannot be used. It also depends on wettability, which means if the reservoir rocks are water-wet, water tends to be strongly imbibed into the rock pores, making it difficult for gas to penetrate and displace the water. In this situation, the gas might not be able to effectively sweep through the reservoir and push the oil toward the production well. This limits the efficiency of gas injection for enhanced oil recovery (EOR) processes.

Additionally, reservoir conditions are the main factor in choosing injection methods, which are part of secondary recovery techniques. For example, reservoirs with heavy crude oil require steam or hot water injection, making gas injection methods unsuitable. Water injection also has higher sweep efficiency compared to gas injection.

From an economic standpoint, water is cheaper than gas. Associated gas with oil needs processing and purification to remove impurities. Therefore, we cannot directly inject gas without undergoing processing operations. Additionally, we would need gas pumping stations and multiple surface facilities, which would increase costs.



WHY?

WHY WE FLARE ?

Reducing flame pollution by amines

This technology is considered one of the carbon capture and utilization technologies where amines, which are versatile organic compounds with unique chemical properties, have shown tremendous potential in capturing carbon dioxide emissions from flares. Its ability to chemically react with carbon dioxide and form stable compounds provides effective greenhouse gas removal from industrial flue gases. In addition, amines can be regenerated and reused, which increases their attractiveness as a sustainable solution.

Amine-based carbon capture relies on solvents and sorbents, which are often saturated with amines, as pivotal components of the capture process. These factors act as catalysts, allowing the absorption and removal of carbon dioxide from industrial exhaust streams and then treating these solvents and isolating carbon dioxide from them for storage by injecting it deep into the ground or using it by injecting it into oil reservoirs to increase its pressure and other uses.

Once the carbon dioxide has been captured by solvents or amine-based adsorbents, the next step involves regeneration. During this stage, changes in temperature or pressure release carbon dioxide captured from the amines. This regenerative process realigns the solvent and sorbent, enabling them to be reused in subsequent capture cycles, enhancing the overall efficiency and sustainability of the carbon capture system.

Carbon capture technology using amines is an exciting approach that holds great promise for reducing the environmental impact of flaring, as well as providing avenues for sustainable use of energy.



SAFETY MESSAGE

The First Incident

Location: Khor Al-Zubair – Basrah - Iraq
Accident Occurred On: 3/7/2022
Accident Type: Cutting and welding - Fire

The Southern Fertilizer Plant is responsible for producing urea and DAP (nitrogen and phosphate fertilizers) in quantities exceeding 3000 tons per day. It is located in Khor Al Zubair and is considered one of the older plants, founded in the late 1970s.

On 3 July 2022, during maintenance work by the plant's maintenance team (cutting and welding activities), an unintentional fire broke out in the debris and damaged wooden materials. The fire rapidly spread, causing damage to the cooling units. This required the involvement and support of the Civil Defense, Basra Oil, and the plant's firefighting teams. The fire was brought under control before reaching the natural gas pipeline that supplies the plant.

What can be done?

Conduct a hazard identification and risk assessment before carrying out maintenance activities involving risks. Hot work should be supervised by a firefighting team or at least a fire watcher. The work area should be secured and isolated from the rest of the site to protect nearby areas and units.



The Second Incident

Location: Luhais Gas Isolation Station
Accident Occurred On: 22 / 9 / 2018
Accident Type: Due Lightning - fire

Oil tanks are considered vital facilities in all types of the oil industry. Each sector of these industries has tanks of different capacities and sizes based on operational conditions and the nature of work. Lightning is considered the most common source of ignition. On a stormy day, on September 22, 2018, at 16:05, a fire broke out in oil tank number 1 at the gas isolation station in Al-Luhais due to lightning. The station's on-duty personnel immediately declared an emergency at level B, forcibly shutting down the station and activating the fixed firefighting system (foam outlets). They also activated the cooling system for the remaining tanks at the station to prevent the temperature of nearby tanks from rising and igniting. They contacted nearby fire stations (Artaoui Fire Station and PS1 Fire Station) for support. Firefighting vehicles were dispatched and arrived at the station, deploying firefighting hoses and extinguishing the fire. As a precautionary measure, the station was then brought back to half capacity, with two firefighting vehicles remaining for monitoring.

What can be done?

Routine monitoring of tank fill/drain levels. Immediate response to the initial alarm for low or high tank fill levels. Responding to all alarm levels. If a high-level alarm is issued, a visual inspection of the tank and the surrounding area must be conducted. Follow methods and procedures for operating hazard analysis (HAZOP) and apply them to both routine and non-routine tasks.



SAFETY MESSAGE

The Third Incident

Location: Chiba, Japan

Date of Incident: 2011/11/03

Type of Incident: Fire and Explosion

The Great East Japan Earthquake was one of the most destructive natural disasters in modern history. The earthquake, which had a magnitude of 9.0, caused a massive tsunami that resulted in widespread destruction along the northeastern coast of Japan.

What are tsunami waves?

The term tsunami is derived from the Japanese words "Tsu," meaning harbor, and "Nami," meaning wave. A tsunami is a series of massive waves created by underwater disturbances and is usually associated with earthquakes occurring below or near the ocean. However, not all earthquakes result in tsunamis. There are four necessary conditions for an earthquake to generate tsunami waves: An earthquake occurs beneath the ocean or as a result of tectonic movements in the ocean. The earthquake should be strong, measuring at least 6.5 on the Richter scale. It should occur at a shallow depth, meaning less than 70 kilometers beneath the Earth's surface. The earthquake should cause vertical movement of the seafloor, reaching several meters, which leads to the displacement of water masses.

she was leaving a trail of destruction affecting multiple high-hazard installations (including the Fukushima Daiichi nuclear power plant). Ground motion from the earthquake damaged support braces on a Liquefied Petroleum Gas (LPG) storage sphere (Tk 364). The tank was undergoing regulatory inspection and had been filled with water to exclude air and check for leakage.

An aftershock 29 minutes later caused its support legs to buckle, and the tank collapsed onto a neighboring pipe track. An uncontrolled LPG release followed which found an unknown ignition source, initiating a major fire. The fire quickly spread to neighboring LPG tanks causing several consecutive boiling liquid expanding vapor explosions (BLEVEs), eventually destroying all 17 tanks in the LPG tank farm. Burning missiles from the explosions also damaged nearby asphalt tanks, causing a loss of containment and spillage into the sea, and the flammable LPG vapor release started fires in 2 neighboring chemical plants. It took 10 to extinguish the fires and 2 years to restore the refinery to full production.

What should be done:

- Incorporate seismic-resistant design features into liquefied petroleum gas storage tanks, including reinforced walls, strong supports, and foundations capable of withstanding strong ground movements.
- Conduct comprehensive geological and technical investigations to identify stable locations for liquefied petroleum gas storage facilities, avoiding areas prone to liquefaction, landslides, or tsunamis.
- Provide regular training and education programs for facility operators and emergency responders to enhance their understanding of seismic risks and preparedness for disasters, as well as effective response measures.
- Implement advanced monitoring systems for continuous assessment of the structural safety of liquefied petroleum gas tanks, including real-time sensing devices to detect vibrations, stress levels, and potential deformations.



A BLEVE is an explosive release of expanding vapor and boiling liquid when a container holding a pressure-liquefied gas—where the liquefied gas is above its normal atmospheric pressure boiling point temperature at the moment of vessel failure suddenly fails catastrophically. This explosive release creates an overpressure wave that can propel vessel fragments, damage nearby equipment and buildings, and injure people. If the pressurized liquid is flammable.

SAFETY MESSAGE

The Fourth Incident

Location: Gulf Coast of Texas and Louisiana.

Accident Occurred On: November 27th, 2019

Accident Type: Explosion.

The Dead Leg That Led to Disaster:

In the world of petrochemical manufacturing, safety is paramount. Unfortunately, the lack of attention to a potential hazard can lead to catastrophic consequences. This was the case for TPC, a company with multiple facilities along the Gulf Coast of Texas and Louisiana. On August 4th, 2019, at TPC's Port Neches plant, a seemingly routine operation triggered a series of events that resulted in a devastating explosion.

TPC's primary focus was on producing butadiene, a highly reactive chemical used as a building block in various products, particularly synthetic rubber. When not managed properly, butadiene can pose serious hazards, including forming a solid substance known as popcorn polymer. This popcorn polymer can accumulate and grow inside process equipment, leading to dangerous pressure buildup and eventual rupture. At the heart of the disaster was a dead leg, an area of piping that remained open to the process but lacked any material flowing through it. A worker shut down a primary pump as part of a routine operation, and when they tried to restart it, the pump failed to operate. Consequently, a spare pump was used to continue operations, leaving the primary pump out of service and creating the dead leg. Over 114 days, popcorn polymer began to form and accumulate within the dead leg. Tragically, no one at TPC recognized the hazard created by this dead leg. On November 27th, 2019, at 12:54 AM, excessive popcorn polymer buildup caused the dead leg piping to rupture, releasing approximately six thousand gallons of butadiene and creating a flammable vapor cloud. The cloud quickly found an ignition source and exploded, causing extensive damage to the facility, injuring several employees and a contractor, and affecting nearby homes and buildings.

What should be done:

- **Comprehensive Risk Assessments:** Companies should conduct thorough process hazard analyses, taking into account all potential scenarios, including the formation of dead legs and the risk of hazardous material accumulation.
- **Dead Leg Management:** Operating procedures must include provisions for dead leg management when primary equipment is offline. This may involve regular circulation of material or the addition of inhibitors to prevent hazardous buildup.
- **Safety Over Operations:** Operational decisions must never compromise safety. The temporary use of a spare pump should not overshadow the potential hazards posed by a dead leg.
- **Continuous Improvement:** Regular reviews and updates of safety procedures are essential. Companies should learn from near-miss incidents and implement corrective measures to prevent similar accidents in the future.



AI USES IN CHEMICAL-ENG.

What is the Artificial Intelligence (AI) ?

Artificial intelligence is a branch of computer science and computational intelligence that aims to create systems and programs capable of carrying out tasks that require thinking and reasoning similar to those that can be performed by humans. In a wide range of applications, we will limit the research to the limits of chemical engineering and the oil and gas industries.

What are the uses of artificial intelligence in chemical and petroleum engineering?

1- Data analysis and predictions:

Artificial intelligence can be used to analyze large datasets generated from production processes in the oil, gas, and chemical engineering industries. Intelligent systems can identify patterns and trends, and discover relationships among different variables, enabling them to provide accurate forecasts of production quantities and future performance. This can help improve the efficiency of production and operations in the oil, gas, and chemical engineering industries. By analyzing real-time operational data and providing recommendations for efficiency improvements and cost reduction, AI can optimize production processes. AI is also utilized for analyzing historical data and conducting technical analysis to forecast future oil and gas prices. Intelligent systems can analyze historical patterns and enhance the ability to predict changes in demand, supply, and other economic factors that impact oil and gas prices.

2- Research and exploration:

Smart systems can locate a high probability of finding new aggregations and improve field design to increase extraction and reduce costs. Artificial intelligence can analyze geological and geophysical data and convert it into valuable information to understand more about the Earth's characteristics and geological composition of fields. Also, artificial intelligence can be used to analyze geological risks and predict potential natural and environmental events that can affect oil, gas, and chemical engineering processes.

3- Smart control and monitoring:

Through intelligent process control, AI can be used to improve the control of industrial processes in the oil, gas, and chemical engineering industries by monitoring and analyzing real-time practical data and making automatic decisions to improve performance and ensure the safety of operations as well as by intelligent monitoring of equipment and devices. AI can monitor the status of equipment and devices in the oil, gas, and chemical engineering industries to detect any abnormal changes in equipment performance and alert operational teams to potential problems before major failures occur.

AI can also be used to improve maintenance plans and predict possible breakdowns in equipment and systems through predictive maintenance and rapid responsiveness where it can analyze operational data and intelligent sensing to detect early signs of deterioration, guide maintenance schedules, and avoid unplanned discontinuation of production.

AI models can be trained to predict the productivity of petroleum wells. Below is a simple AI model that can predict the productivity of a particular well by introducing specific good data (pressure, temperature, and depth of well deport) through an Excel sheet and linking it to the following model:

AI USES IN CHEMICAL-ENG.

```

1 import pandas as pd
2 import numpy as np
3 import tensorflow as tf
4 from sklearn.model_selection import train_test_split
5 from sklearn.preprocessing import MinMaxScaler
6
7 # تحميل البيانات
8 data = pd.read_csv('oil_wells.csv')
9
10 # اختيار الميزات المستقلة (X) والبيانات المستقلة (y)
11 X = data[['well_depth', 'pressure', 'temperature']]
12 y = data['productivity']
13
14 # تقسيم البيانات
15 scaler = MinMaxScaler()
16 X_scaled = scaler.fit_transform(X)
17
18 # تقسيم البيانات إلى مجموعة تدريب ومجموعة اختبار
19 X_train, X_test, y_train, y_test = train_test_split(X_scaled, y, test_size=0.2, random_state=0)
20
21 # إنشاء النموذج
22 model = tf.keras.models.Sequential([
23     tf.keras.layers.Dense(64, activation='relu', input_shape=(3,)),
24     tf.keras.layers.Dense(64, activation='relu'),
25     tf.keras.layers.Dense(1)
26 ])
27
28 # تدريب النموذج
29 model.compile(optimizer='adam', loss='mean_squared_error')
30 model.fit(X_train, y_train, epochs=100, batch_size=32)
31
32 # تقييم النموذج على مجموعة الاختبار
33 loss = model.evaluate(X_test, y_test)
34 print('Mean Squared Error: ', loss)
35
36 # التنبؤ بالبيانات الجديدة
37 predictions = model.predict(X_test)

```

It can be used after uploading **python** from **python** and then from the list of accessories in **vs code** upload **Python** and then create a new file in **Python** for example (**name.py**), and paste the code above and before running it make sure to download the libraries by inserting the order **pip install pandas learn TensorFlow** in the orders entrance and then you can press the icon run and **run** the order and you can edit the code to suit you **following the case in green color**.

4- Predictive maintenance:

Using technologies such as machine learning, oil, gas, and engineering companies can predict and verify the state of equipment and devices for early detection of breakdowns and avoid unplanned stoppages, reducing maintenance costs and downtime. This is done through predicting breakdowns and early diagnosis where AI is used to analyze operational data and continuous monitoring of production equipment and systems.

or through improved maintenance schedules is used to analyze historical operational and maintenance data and generate maintenance schedules based on the actual condition of the equipment. It can also determine the best time for maintenance, and save excess maintenance costs and unplanned cut-offs for production.

5- Smart drilling :

Artificial intelligence can be used to improve drilling operations, where machine learning techniques can be used to analyze well data, improve reasoning, and make appropriate decisions during drilling operations. Artificial intelligence can analyze geological and geophysical data and ongoing operational information to provide accurate decision-making recommendations during drilling.

AI helps improve well orientation and locate a higher interest in oil and gas and is used to analyze fossil data generated in real-time during drilling operations. It can also monitor drilling parameters, vibrations, mud pressure, and other indicators to accurately assess the situation and detect potential problems

It also plays a significant role in predicting malfunctions, maintaining safety and improving drilling planning, using artificial intelligence to analyze geological and engineering data, and providing accurate recommendations for drilling planning. Helps identify optimal well pathways and improve drilling efficiency.

What are the oil companies that utilize artificial intelligence?

There are many oil companies based in Iraq, and the world uses artificial intelligence to analyze data and forecasts. These companies include:

1- basra oil company :

It is one of the largest oil companies in Iraq and works to improve the use of artificial intelligence in data analysis and prediction of production and changes in the oil market. Artificial intelligence plays a vital role in Basra Oil Company in many aspects, including analysis of large amounts of data related to oil production, drilling, equipment, aerial forecasts, and other variables associated with the company's operations as well as improvement of production processes. Predictive maintenance, improved drilling strategies, and accurate recommendations that ensure production planning and distribution and improved resource utilization

Basra Oil Company uses artificial intelligence in several departments and bodies within the enterprise to improve operations and enhance efficiency **including the production planning department, exploration and exploration department, production and operation department, maintenance department, and strategic planning department**

These are just examples and Basra Oil Company may use artificial intelligence in more departments and bodies based on its own needs.



AI USES IN CHEMICAL-ENG.

2- Aramco :

Aramco is the largest oil producer in the world, selling more than 10 million barrels of oil per day. This is equivalent to three times the production of the largest oil company listed on the global market, ExxonMobil, which provides 10% of the global oil needs and is assisted by modern methods and technologies such as smart sensors. Wireless Networks and Data Communication, Smart Analysis Systems, and Predictive Forecasting and Maintenance Systems are moving forward to become the world's largest oil producer. It should be noted that all the technologies mentioned above are mainly based on AI technologies.

On September 14, 2019, Houthi groups targeted two laboratories of Laramco, leading to a jump in global oil prices and major fires in those installations, which halved production. The strikes halted production of 5.7 million barrels of oil. However, the experience and techniques used in Aramco demonstrated its ability to overcome exceptional requirements in four minutes. the company succeeded in putting out the fires and 48 hours after the attack the company successfully operated some production lines after two weeks the maximum productive capacity returned to work in the company to then prove its quarter on the throne of black gold.



3- Halliburton :

One of the world's leading companies in providing services and technologies for the oil and gas industry. Halliburton uses smart bar technologies in its operations to improve oil and gas extraction efficiency and provide advanced technology solutions. Halliburton provides advanced technology solutions called "SmartWell", which use smart well technology * These technologies include real-time data sensing, data analysis, and smart decision making. These techniques make it possible to analyze big data on wells and achieve improvements in design, drilling, and production processes to increase productivity and efficiency.



Halliburton also uses smart analytics and predictive diagnostic techniques to detect early breakdowns and anticipate maintenance needs. These techniques depend on the analysis of historical data.



It is also worth mentioning that many oil companies use AI technologies in particular the male wells in addition to the previously mentioned companies, including ExxonMobil, BP, Total, Shell, and others.

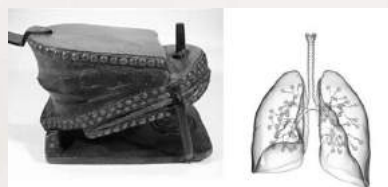
Smart wells are considered one of the most advanced technologies of the petroleum industry to manage and invest fields in a way that reflects their efficiency and provides opportunities to enable engineers to observe and manage their fields instantaneously and continuously, and in more efficient and efficient ways and uses smart wells technology in production wells to improve the productivity of the well in general in terms of controlling the production of layers (due to different permeability) and control of water production as it is used in water injection wells where we need it to control the injected water so that it does not go to the higher permeable areas than the lower permeable areas.

EXCERPTS

FROM THE AICHE CHAPTER REPORTS

Did you know that the first air compressor used was the human lung?

This is because the human body is capable of exhaling air, and primitive people used their breath to blow on embers and create fire. However, healthy lungs can only produce air pressure of 0.02 to 0.08 bar. Therefore, there was a need for higher temperatures and a stronger source of air. This is where the development of air compressors began, starting with the use of wind and blowpipes by Egyptian and Sumerian metallurgists. This was followed by the invention of the first mechanical air compressor—the bellows—operated manually. Then came the more efficient foot-operated bellows, invented around 1500 BC. This device, a flexible bag that can change its size through compression or expansion, achieves a concentrated burst of air ideal for achieving higher temperature fires. With the advancement of technology, modern air compressors have been invented, relying on advanced engines and techniques to generate air pressure with higher efficiency and greater power.



scan the QR code to read the full report



One of the most stunning natural landscapes around the world is the frozen methane bubbles in Canada

Methane gas bubbles are trapped beneath the water, creating a mesmerizing sight during the winter months in frozen lakes in Canada, such as Abraham Lake. This lake is an artificial lake due to the presence of plants that live at the bottom. During their biological processes, methane gas is released, which freezes when it reaches a certain cold temperature near the lake's surface. However, these bubbles can be dangerous in the summer season when they reach the surface and explode, releasing methane into the atmosphere and contributing to greenhouse gas emissions.



scan the QR code to read the full report

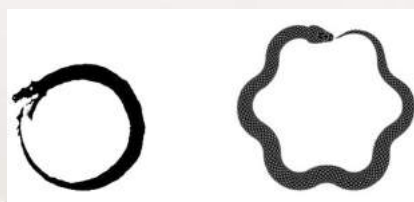


EXCERPTS

FROM THE AIChE CHAPTER REPORTS

The Ouroboros Symbol and the Scientist Kekulé

In 1865, the scientist Kekulé proposed that benzene is a six-sided ring consisting of six carbon atoms and six hydrogen atoms, with each hydrogen atom connected to a carbon atom. However, during the benzene conference in 1890, Kekulé spoke about the creation of the theory. He said that he discovered the circular shape of the benzene molecule after envisioning or dreaming of a snake biting its tail. This ancient symbol is known as Ouroboros, which is often associated with introspection and the endless cycle of creation and infinite destruction in nature.



scan the QR code to read the full report



Did you know where the final fraction that comes out of the atmospheric distillation tower goes?

The final fraction that comes out of the atmospheric distillation tower consists of a group of unrefined petroleum products (such as wax, asphalt, heavy oils, etc.). It goes to the vacuum distillation, which is a distillation process that occurs under low pressure or vacuum conditions. It is used in various industries to separate and purify heat-sensitive or high-boiling point materials. The main purpose is to lower the boiling points of the substances being distilled by reducing the pressure, allowing distillation at lower temperatures, which helps prevent thermal degradation or decomposition of the desired components.



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Myths



Facts

Chemical engineering is harmful to the environment.

Chemical engineering play a vital role in developing sustainable processes and minimizing environmental impacts through green engineering practices.

The speed of light is constant in all situations.

The speed of light in a vacuum is constant, but it can change when passing through different materials.

Oil is a liquid.

Oil is a liquid, but it can also be found in solid or semi-solid forms, such as asphalt.

Nuclear power is harmful for the environment.

Nuclear power plants do not emit carbon emissions, unlike fossil fuel burning, which releases over one-third of greenhouse gases.

Chemical engineering is not important in space.

Chemical engineering is crucial in space, studying the impact of cosmic radiation on materials, and influencing their chemical composition and crystal structure.

Diamonds are formed from compressed coal.

Diamonds are formed deep within the Earth under high pressure and heat, but not from coal.

Burning rocket fuel in space does not affect the Earth.

Rocket fuel combustion can deplete the ozone layer, releasing chlorine and bromine into the upper atmosphere, and reducing its ability to block harmful ultraviolet rays.

Oil is produced by the decomposition of dinosaurs.

Most of the current oil reserves are the result of the decomposition of ancient marine organisms and plants, not primarily the decomposition of dinosaurs.

The concept of "right-brained" and "left-brained" people is valid.

indeed Brain functions involve both hemispheres; the notion of dominant brain sides oversimplifies brain complexity.

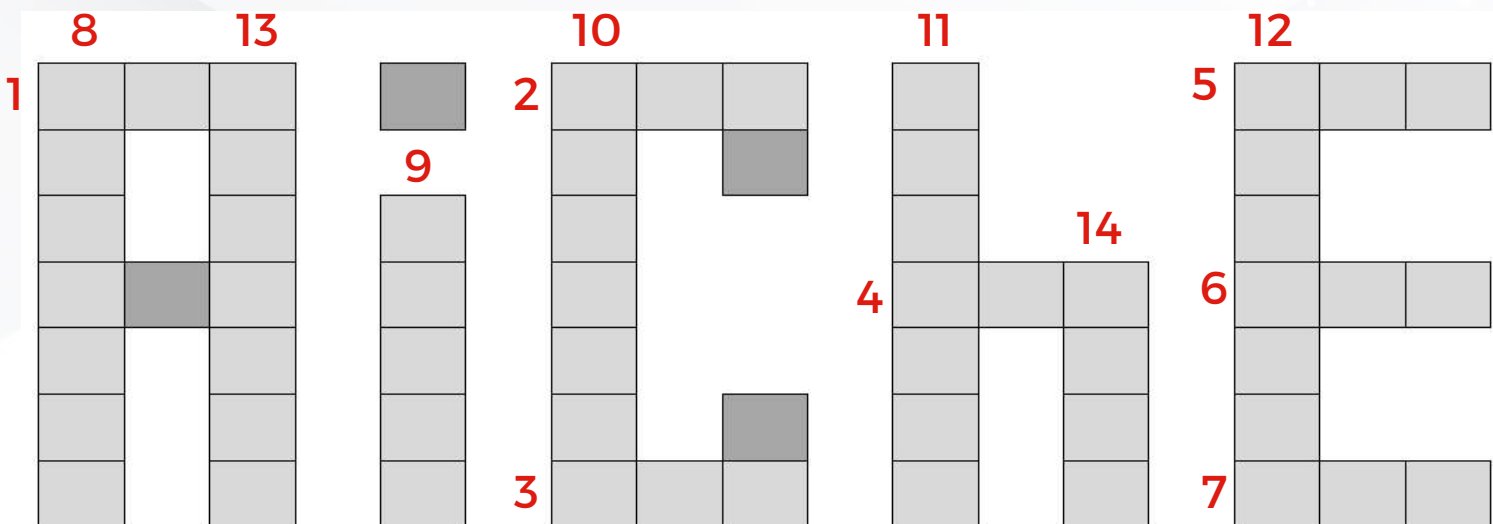
All plastics are 100% recyclable, and recycling solves all plastic waste problems.

Plastic recycling is a valuable waste management practice, but it has limitations, and not all plastics are easily recyclable.

ACROSS

DOWN

Solve the puzzle and find the words that fill the squares to complete the AIChE



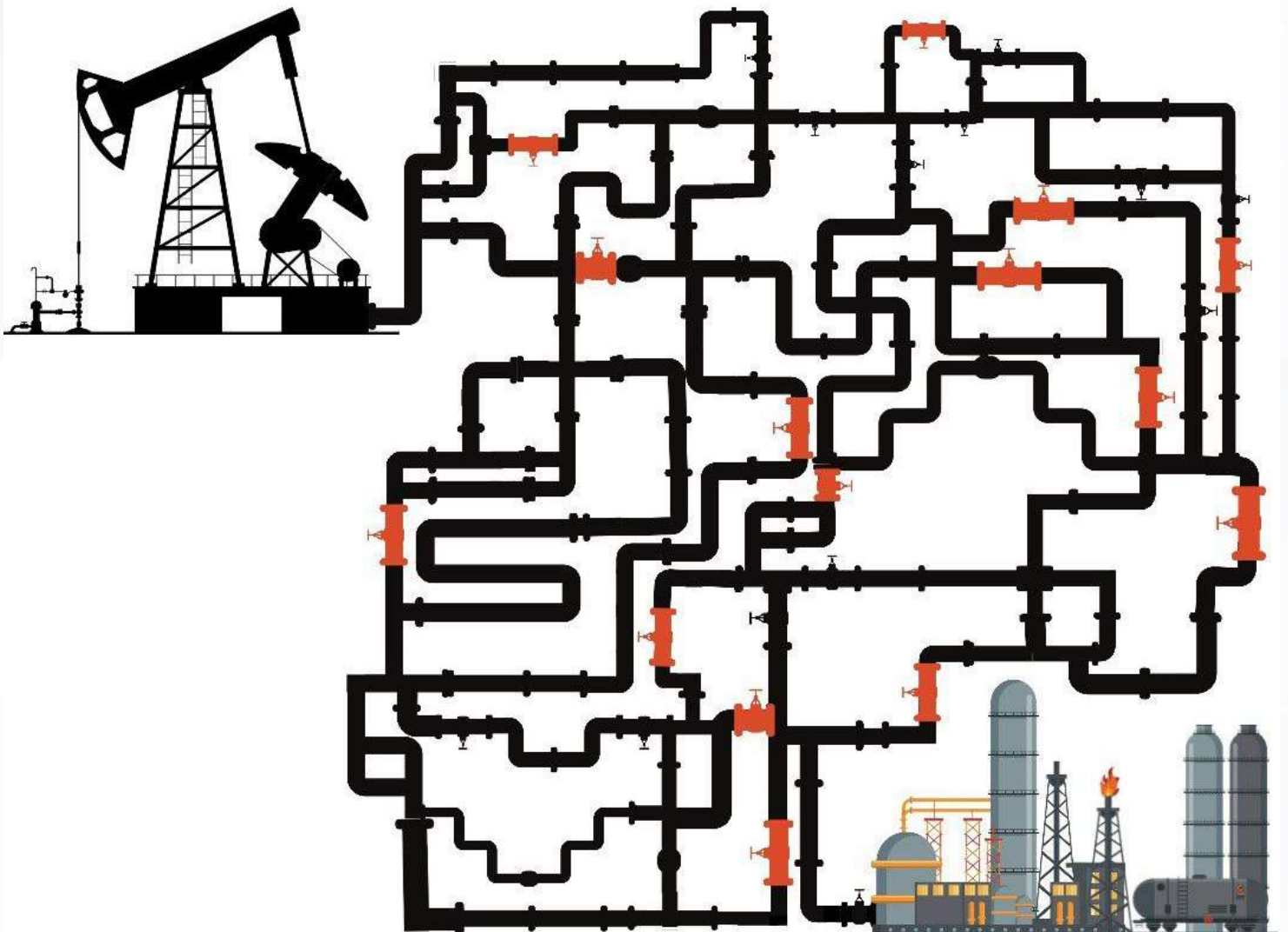
Horizontal:

- 1- What are the different ways to recover oil from a reservoir other than using natural reservoir pressure?
- 2- How can the fuel's resistance to knocking be determined?
- 3- How can the fuel's tendency to boil at a given temperature be determined?
- 4- What is the fuel that can be used to power a wide range of transportation modes, including ships, trains, and trucks?
- 5- What is the world's largest trade association for the oil and natural gas industry?
- 6- What is the management system that helps organizations identify, assess, and control workplace hazards and risks?
- 7- Yellow solid explosives are used in industrial applications such as mining, oil and gas production, so what are they?

Vertical:

- 8 - One of the most common types of biofuel used in transportation, and it is produced from corn or sugarcane, so what is it?
- 9 - What is the most perishable equipment in the refinery?
- 10 - What type of facility processes crude oil into petroleum products?
- 11 - what are the heavy oils from the oil refining process, used as fuel for power stations, industry, marine boilers, etc?
- 12 - What is the residue left after crude oil is distilled in a refinery and used to coat oil storage tanks and pipelines to protect them from corrosion?
- 13 - What equipment in a refinery converts low-quality crude oil into higher-quality products?
- 14 - What type of valve has only two states, fully open and fully closed?

Maze



"Connect the extracted oil to the refinery. Red valves are closed, and black ones are open. Good luck."

CHAPTER ACHIEVEMENTS

Social charity activities, help to improve the connections between our members within the community.



Month talker program
Is a program to engage with expert chemical engineers working in various industries.



Workshops by our top students to help the other students.



Our great design team student has designed all of these posters for research and certifications.



Establishment of our website by our student members.





Future Engineers Competition 2023

It is a scientific debate competition, Which provides an opportunity for students to show their skills and scientific abilities.



More than 100 Sessions concerning the field of chemical engineering and the oil & and gas industry.



More than 8000 Certifications Delivered.



More Than 15 Scientific researches have been published on LinkedIn having a variety of chemical engineering and Oil & and gas industry aspects.



An Idea Shaped by developing and by being the performers, a New English Training Program "Compass camp 2022 & 2023" with a new Concept That helps the participants prepare for the job interviews break the fear of speaking in public, and improve their English language speaking skills.

Magazine Team



Fatima Jaafer Adnan
Magazine Team Leader



Mohammed Ahmed
Manager of scientific Team



Muslim Ali
Member of Magazine Team



Banen Muhammed
Member of Magazine Team



Zainab Hassan
Member of Magazine Team



Mahmood Hashim
Member of Magazine Team



Howraa Qahtan
Member of Magazine Team



Saba Mohammed
Member of Magazine Team



Tabarak Abdulrahim
Member of Magazine Team

Magazine Team



Sajida Jaafar Kadhim
Design Team Leader



Hussien Ismail Namr
Designer



Murtada Hamed kadhim
Designer

AiChE

BUOG STUDENT CHAPTER

CONTACT US



<https://buog000aiche000website.on.drv.tw/aiche/>



BUOG AIChE Student chapter



BUOG AIChE Student chapter



BUOG AIChE Student chapter



BUOG.AIChE



BUOG AIChE Student chapter



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SCAN ME

